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## **Therapy of acute myocardial infarction in Switzerland - the AMIS Plus Registry**

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Abstract: AMIS Plus, the Swiss national registry of acute myocardial infarction (MI), founded by the Swiss Societies of Internal Medicine, Cardiology and Intensive Care Medicine, supports robust quality improvement efforts designed to encourage evidence-based acute cardiac care and ultimately improve patient outcome. Since 1997, data of patients hospitalized in 81 Swiss hospitals with acute coronary syndromes are collected, and in June 2012, the 40'000th patient was enrolled.

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# Therapy of acute myocardial infarction in Switzerland – the AMIS Plus Registry

AMIS Plus, the Swiss national registry of acute myocardial infarction (MI), founded by the Swiss Societies of Internal Medicine, Cardiology and Intensive Care Medicine, supports robust quality improvement efforts designed to encourage evidence-based acute cardiac care and ultimately improve patient outcome. Since 1997, data of patients hospitalized in 81 Swiss hospitals with acute coronary syndromes are collected, and in June 2012, the 40'000<sup>th</sup> patient was enrolled.



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AMIS Plus is the largest health care registry in Switzerland. Essentially, it is a tool for monitoring and understanding the use and practicability of knowledge gained from randomized trials, how these transfer into real-world clinical situations and locate where there is room for optimization.

All Swiss hospitals treating MI are eligible to take part. Participating centers, ranging from community care institutions to large tertiary care facilities, provide blinded data for each patient through a standardized internet- or paper-based questionnaire. These are checked for plausibility and consistency by the AMIS Plus Data Center in the Institute of Social and Preventive

Medicine at the University of Zurich. Data quality is of utmost priority and external random monitoring is conducted annually. The registry was approved by the Supra-Regional Ethics Committee for Clinical Studies, the Swiss Board for Data Security and the cantonal ethics commissions.<sup>1</sup>

Throughout the years, the questionnaire has been regularly revised and improved in order to take into account advances in patient treatment. In order to evaluate mid-term outcome, patients enrolled in the AMIS Plus registry who gave their formal signed consent are contacted 3 months and 1 year after the event. Approximately 40% of the patients were asked and

interviews were successfully carried out with over 90% of these patients. The AMIS Plus online reporting system - only available to the authorized person in charge of AMIS Plus in each hospital - allows hospital benchmarking using current AMIS Plus hospital data against the AMIS Plus data of all other hospitals or against hospitals of the same size.

The selected analyses of the entire AMIS Plus patient population can be depicted according to admission year, age categories, sex or diagnosis. This way, the knowledge gained ("learn from the best and improve") enables a quick translation into everyday practice.

## KeyPoints

- AMIS Plus is the largest health care registry in Switzerland.
- Since 1997, data of patients hospitalized in 81 Swiss hospitals with acute coronary syndromes are collected, and in June 2012, the 40'000<sup>th</sup> patient was enrolled.
- Time between symptom onset and first medical contact is still too long. It took more than 100 minutes before a patient with STEMI contacted a doctor and approximately 180 minutes for NSTEMI patients.
- In the last decade, the great improvement in treatment of AMI patients has led to a halving of the in-hospital mortality rate which is currently around 5%.

During the last 15 years, in-hospital mortality has drastically reduced as has hospital stay. The time needed for work-up in hospital has been importantly reduced and the large burden of therapies switched from lytic therapies to percutaneous mechanical therapy.<sup>2</sup> All information pertaining to this project can be found at [www.amis-plus.ch](http://www.amis-plus.ch).

Using the AMIS Plus data of 6777 patients from the last 3 years (2010-

	STEMI	NSTEMI
Age in years (mean±SD)	65±13	67±13
Female (%)	26	27
Coronary artery disease (%)	27	41
Cerebrovascular disease (%)	5	7
Heart failure (%)	3	3
Diabetes (%)	18	23
Renal disease (%)	7	9
Cancer (%)	6	6
Hypertension (%)	58	68
Dyslipidemia (%)	51	59
Current smoker (%)	42	35
Obese (BMI>30) (%)	22	23
Resuscitation prior admission (%)	7	3
Killip classes >2 (%)	10	6
STEMI: ST-elevation myocardial infarction NSTEMI: Non-ST-elevation myocardial infarction		

Table 1: Baseline characteristics of the patients presenting with acute myocardial infarction

2012) we show how MI patients are currently treated in Switzerland.

### MI patients

The baseline characteristics of the patients with ST-elevation MI (STEMI) and non-STEMI (NSTEMI) are shown in table 1.

### How are MI patients treated in Switzerland today?

Time between symptom onset and first medical contact is still too long. It took more than 100 minutes before a patient with STEMI contacted a doctor and approximately 180 minutes for NSTEMI patients. Then another hour

passed before the STEMI patients arrived at hospital. Less than a quarter of MI patients arrived in hospital within 6 hours. In contrast to randomized clinical trials, AMIS Plus data have shown that around 2% of all patients with MI are palliatively treated receiving only aspirin and symptomatic therapy due to their general status, the severity of comorbidities, critical illness or denial of specific, especially interventional therapy.

Almost 25% of NSTEMI patients and 11% of STEMI patients were treated conservatively. Although thrombolysis was the reperfusion option in the 1990s, this is no longer the case. Less than 1% of the patients presenting with STEMI in this study were treated with thrombolysis. The majority of patients - over 86% - underwent a percutaneous coronary intervention (PCI), which was the primary strategy for 80% of patients. Time between admission and start of intervention - “door-to-balloon time” - is short in Switzerland with a median of 55min. This indicator of treatment quality is even more important if we take into consideration that around 27% of patients were initially admitted to smaller hospitals before being transferred for intervention.

From the AMIS patients who underwent PCI, 95% received one or more stents; 25% of the patients received bare-metal stents and 75% of the patients received drug eluting stents.

Early drug therapy is depicted in Figure 1.

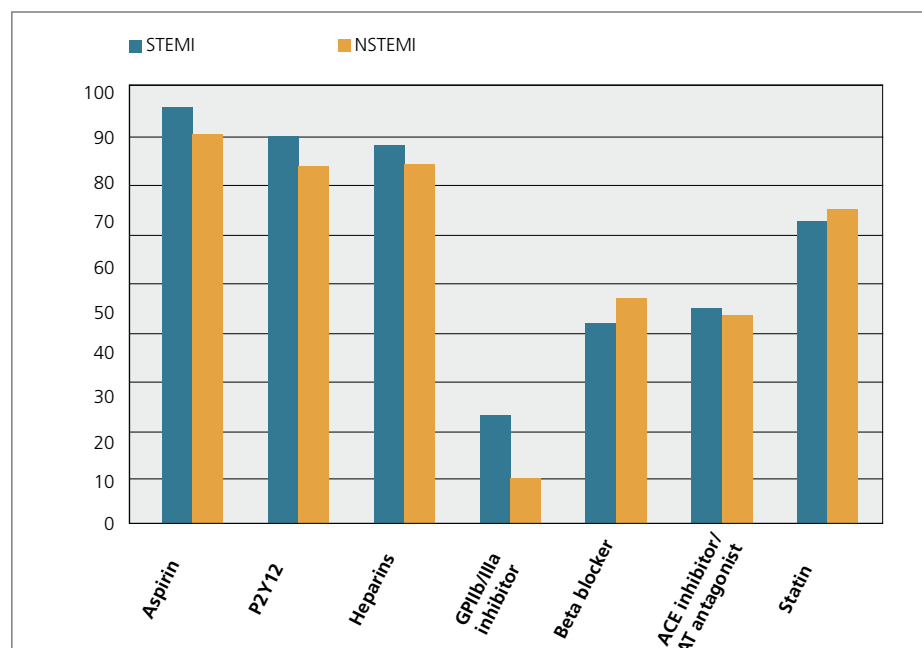


Fig. 1: Early drug therapy in the patients presenting with acute myocardial infarction

Anticoagulant options included unfractionated heparin or low molecular weight heparin and was given to almost all AMI patients. In addition, a variety of anticoagulant drugs have undergone clinical evaluation in randomized trials over the past decade, such as fondaparinux, bivalirudin and an inhibitor of factor Xa - rivaroxaban. These anticoagulants are slowly moving into the real world population with fondaparinux being used in over 2%, bivalirudin in 1.5% and rivaroxaban in around 0.5% of MI patients.

GPIIb/IIIa inhibitor was rarely prescribed compared to a few years ago. The new ESC Guidelines<sup>3</sup> recommend an ADP-receptor blocker (P2Y<sub>12</sub> blocker) in addition to aspirin for patients presenting with STEMI. The most frequently used P2Y<sub>12</sub> blockers are currently clopidogrel (67%), followed by prasugrel (27%) and ticagrelor (8%).

Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers are well established and were given to patients with impaired ejection fraction or heart failure in the early phase. Beta blocker therapy is beneficial to AMI patients<sup>4</sup> and was provided to half the AMIS patients. Many clinical trials have equivocally demonstrated the benefit of early and intensive statin therapy.<sup>5</sup> This is well implemented in daily clinical practice in Switzerland with over 70% of all AMI patients receiving statins.

Of the discharged AMI patients, the

majority received evidence-based medication, but only one third went directly to rehabilitation.

In the last decade, the great improvement in treatment of AMI patients has led to a halving of the in-hospital mortality rate which is currently around 5%.

Thanks to the excellent work carried out by the numerous hospitals and the Data Center, the AMIS Plus Project helps all players ensure that patients with MI in Switzerland are provided with the best possible treatment. ■

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